Library

HONOLULU
LA JOLLA
MONTEREY
TIBURON

SOUTHWEST FISHERIES CENTER

MONTHLY REPORT - JANUARY 1982

TABLE OF CONTENTS AND RESEARCH HIGHLIGHTS

	Page
PUBLICATIONS	1
HONOLULU LABORATORY	5
Deepwater Crabs Identified	6
Progress Made in Developing Tuna and RAIMOA Data Management Systems	11
LA JOLLA LABORATORY	13
Feasibility of Establishing U.S. Winter Longline Fishery for Albacore Tuna to be Investigated	13
U.S. and Soviet Scientists Collaborate on Dolphin Research	20
TIBURON LABORATORY	26
Effects of Pollutants on Parasitized Striped Bass Analyzed	27
PACIFIC ENVIRONMENTAL GROUP	30
Multivariate Models Developed for Skipjack Tuna and Dungeness Crab	30
FISHERIES INFORMATION SYSTEMS AND AUTOMATIC DATA PROCESSING	31
A Description of the WPACFIN--The Western Pacific Fishery Information Network	31
MISCELLANEOUS	36
Honors, Awards, Seminars, Public Affairs, Visitors Meetings and Travel, and Personnel	36

NOAA/NMFS

To change the delivery address of the Southwest Fisheries Center Monthly Report, or to cancel your subscription, please notify:

Editor, Southwest Fisheries Center
P. O. Box 271
La Jolla, California 92038

IZADORE BARRETT, Center Director

JOHN F. CARR, Deputy Director

LILLIAN VLYMEN and

SHARI SITKO, Editors

SOUTHWEST FISHERIES CENTER

LA JOLLA, CALIFORNIA

HONOLULU LABORATORY
LA JOLLA LABORATORY
TIBURON LABORATORY
PACIFIC ENVIRONMENTAL GROUP

MONTHLY REPORT - JANUARY 1982

STATUS OF PUBLICATIONS

Published

Hunter, J. Roe and Roderick Leong. 1981. The spawning energetics of female northern anchovy, Engraulis mordax. Fish. Bull., U.S. 79(2): 215-230.

The seasonal pattern in incidence of postovulatory follicles in northern anchovy females indicated that they spawn about 20 times per year. The maturation rates of females in the laboratory indicated that they were capable of maturing a spawning batch of eggs at weekly intervals. Examination of the egg size frequency distributions in sea-caught specimens indicated that vitellogenesis and egg maturation continued until the last spawning. We evaluated for northern anchovy the fat-water balance, caloric values of tissues, annual fat cycle, seasonal changes in egg weight, total calories present in a mature ovary, batch fecundity; and determined in the laboratory the gross caloric conversion efficiency (12.8%). These measurements indicated that the caloric equivalent of only two spawning batches are present in a mature ovary at any time and that two-thirds of the annual cost of 20 spawnings could be supplied by fat stores. Estimates of annual reproductive effort (egg calories/ration calories X 100) ranged from 8% for 1 year to 11% for 3 year-old females. A daily ration of copepods equivalent to 4-5% of female wet weight per day is required to support the annual cost of growth and reproduction.

Hunter, John R., Sandor E. Kaupp, and John H. Taylor. 1981. Effects of solar and artificial ultraviolet-B radiation on larval northern anchovy, Engraulis mordax. Photochemistry and Photobiology 34: 477-486.

Northern anchovy larvae were exposed to various amounts of both natural (global solar) and artificial (sunlamps filtered by cellulose triacetate) UV-B energy over a 12-day period. Dosage was determined on the basis of a weighting function for biological effectiveness. The action spectrum on which this biologically effective dose for anchovy mortality is based was developed using broad-band spectroscopy. These experiments indicated that biologically adverse conditions exist near the sea surface. Larvae exposed in shallow containers to global solar UV for 12 days suffered significant UV mortality from February to October. Larvae surviving all solar and artificial UV doses were smaller than those not exposed to UV. [Lowest dosage = 398 J m^{-2} (bio.eff.).] Fifty percent of the larvae survived a cumulative dose of 605 J m^{-2} (bio.eff.), or 50 J m^{-2} day^{-1} (bio.eff.). Dose reciprocity did not hold; when a similar cumulative dose was given in the first 4 days of 12, there were about one-half as many survivors.

One meter below the sea surface the daily solar UV dose (corrected for average cloud cover) is equal to or greater than 50 J m^{-2} (bio.eff.) (33°N, 118°W), the daily equivalent of the LD_{50}, for 7 months of the year (March to September) at moderate chlorophyll-a concentrations (0.5mg m^{-3}). These data suggest that larvae in the sea may be subject to some UV-B stress at present. Owing to their seasonality of spawning and vertical distribution, anchovy populations may not be gravely endangered by moderate degrees of stratospheric ozone diminution.

Huppert, Daniel D. 1981. Economic analysis for northern anchovy management. Pages 41-80 in Lee G. Anderson (ed.). Economic Analysis for Fisheries Management Plans. Ann Arbor Science Publishers, Inc., Ann Arbor, Michigan.

Jennings, Jacqueline G., James M. Coe, and Walter F. Gandy. 1981. A corral system for examining pelagic dolphin schools. Mar. Fish. Rev. 43(11): 16-20.

Laurs, R. Michael, and Jerry A. Wetherall. 1981. Growth rates of North Pacific albacore, Thunnus alalunga, based on tag returns. Fish. Bull., U.S. 79(2): 293-302.

Estimates of growth parameters for North Pacific albacore, Thunnus alalunga, were based on tag-recapture statistics, using the standard von Bertalanffy model and an extended model. Sequential estimation of L_x and K allowed us to test hypotheses concerning

variation in growth rate between tagged albacore recaptured in different ocean regions.

Significantly lower growth rates were found in albacore recaptured off Japan and the United States north of latitude 40° north compared with those recaptured off the United States south of latitude 40° north. The differences in estimated growth rate were generally consistent with differences in length-frequency distribution of albacore taken off the United States north and south of latitude 38° north during the period when most recaptures were made. The findings add to a growing body of evidence that the North Pacific albacore population is not homogeneous; rather, at least two different subpopulations may exist.

Perrin, W.F., E.D. Mitchell, J.G. Mead, D.K. Caldwell, and P.J. H. van Bree. 1981. Stenella clymene, a rediscovered tropical dolphin in the Atlantic. J. Mamm. 62(3): 583-598.

Stenella clymene has not been recognized as a valid species in recent lists of cetaceans. Examination of new material allows the redescription of this valid species. Externally, it closely resembles S. longirostris; cranially, it resembles S. coeruleoalba in shape, but is smaller. S. clymene is now known from New Jersey, Florida (both coasts), Texas, the Caribbean, the mid-Atlantic and West Africa. New records of S. longirostris extend its known range in the western Atlantic north to Cape Hatteras and south to Rio de Janeiro.

Webb, P.W. 1981. The effect of the bottom on the fast start of flatfish Citharichthys stigmaeus. Fish. Bull., 79(2): 271-276.

Fast starts of the speckled sanddab, Citharichthys stigmaeus, were initiated by a 1 volt per centimeter direct current electric shock and recorded on movie film at 250 frames per second. Observations on kinematics and performance were made for fast starts of fish accelerating in the water column and from a grid located at a distance of 0, 1, 3, or 6 cm above the true bottom. During acceleration the body was bent into a U-shape relative to the bottom. The body sustained a direct push against the grid when accelerating from that grid. The amplitude of propulsive movements of fish accelerating from the grid was larger than acceleration movements of fish in the water column away from the bottom, because the potential for energy wastage due to recoil of the body was prevented by the grid. The distance between the grid and the bottom had no effect on fast starts, ruling out any hydrodynamic ground effect. Motion of fish accelerating in the water column was continuous and predominantly in the horizontal plane. There was little motion of fish accelerating from the grid until they started pushing against that grid. Motion was predominantly in the vertical plane. The resultant distance traveled by fish accelerating from the grid, measured at the end of the principal acceleration period exceeded that of fish

accelerating in the water column. Velocities and acceleration rates were highest for fish accelerating from the grid. It was concluded that contact with the sea bottom would enhance fast-start performance of flatfish.

Weihs, D. and H.G. Moser. 1981. Stalked eyes as an adaptation towards more efficient foraging in marine fish larvae. Bull. Mar. Sci. 31(1): 31-36.

The development of stalked eyes in the larvae of some midwater marine fish species is studied. Our mathematical analysis suggests that this adaption results in an increase in feeding efficiency.

White, Merrill J., Jr., Jacqueline G. Jennings, Walter F. Gandy, and Lanny H. Cornell. 1981. An evaluation of tagging, marking, and tattooing techniques for small delphinids. NOAA-TM-NMFS-SWFC-16, 142 pp.

Approved by Center Director

Bartoo, Norman W. and Keith R. Parker. Stochastic age-frequency estimation using the von Bertalanffy growth equation. For consideration for publication in Fishery Bulletin, U.S.

Dizon, Andrew E. and George H. Balazs. Radio telemetry of Hawaiian green turtles at their breeding colony. For consideration for publication in Marine Fisheries Review.

Hunter, John R. and Kathleen M. Coyne. The onset of schooling in northern anchovy larvae, Engraulis mordax. For consideration for publication in CalCOFI Reports.

Smith, Tim D. Changes in size of three dolphin populations (Stenella spp.) in the eastern tropical Pacific. For consideration for publication in Fishery Bulletin, U.S.

Stevens, Elizabeth G. and H. Geoffrey Moser. Observations on the early life history of the mussel blenny, Hypsoblennius jenkinsi, and the bay blenny, Hypsoblennius gentilis, from specimens reared in the laboratory. For consideration for publication in CalCOFI Reports.

HONOLULU LABORATORY

INSULAR RESOURCES INVESTIGATION

Life History Studies on Northwestern Hawaii Islands Fish Species Continue

This month Richard N. Uchida, Leader of the Insular Ecosystem Study, and James H. Uchiyama, Fishery Biologist, continued work on the preparation of the Northwestern Hawaiian Islands (NWHI) fishery atlas. In addition, Uchiyama completed age and growth studies on gindai, Pristipomoides zonatus, which is a minor component in the snapper-grouper species complex in the NWHI. Based on the count of annuli (annual marks) on the sagittae of 25 specimens, Uchiyama obtained the following estimates of von Bertalanffy growth parameters: L_∞ = 43.1 cm, K = 1.087, and t_o = 1.514. Mean age-length relationships were: 3 yr = 34.5 cm, 4 yr = 40.3 cm, 5 yr = 42.0 cm, and 6 yr = 43.0 cm. These results based on the count of annuli are in agreement with earlier studies based on counts of daily growth increments.

Research assistant Michael P. Seki processed 56 stomach and spew samples from the sea bass, Epinephelus quernus, as part of a continuing study of the food habits of fish of the NWHI. The sea bass data plus those from pig ulua, Caranx cheilio, were added to the NWHI data base. Manuscripts describing the results of the food studies on these two species are presently in preparation and brief life history descriptions of these species will also be included in the fishery atlas.

Research assistants Robert L. Humphreys, Jr. and Steven H. Kramer completed the stomach analysis of 447 kahala, Seriola dumerili, and began the analysis of data collected over a 2-yr period at Honolulu's United Fishing Agency. Included in the study are 149 fish caught in the NWHI that were determined to be nonciguatoxic based on the radioimmunoassay (RIA) test, 149 nonciguatoxic fish caught near Penguin Bank and the island of Hawaii, and 149 fish caught near these latter two areas that were determined to be ciguatoxic or borderline ciguatoxic. Humphreys and Kramer reexamined cephalopod beaks and unidentified fish and invertebrate remains found in the stomach contents of the kahala in an attempt to identify previously unidentified material.

Research assistant Alan R. Everson continued his study of the fecundity and sexual maturity of ehu, Etelis marshi. Using a volumetric method of estimating fecundity, the number of eggs spawned by a 1.86 kg ehu in one spawning was estimated at 700,000 eggs. Everson also began a literature search on fecundity and maturation studies and began preparing a manuscript on his ehu and kalikali, Pristipomoides sieboldii, studies.

Workshop Held to Discuss Tropical Biomass Ecosystem Model

Dr. Jeffrey H. Polovina, Leader of the Resource Assessment Investigation of the Mariana Archipelago (RAIOMA), conducted an informal workshop on January 20 with principal investigators involved in the Northwestern Hawaiian Islands cooperative research program. The purpose of the workshop was twofold: (1) to present Polovina's Tropical Biomass Ecosystem Model (TBEM) developed for the French Frigate Shoals ecosystem to the researchers in order to solicit their comments and suggestions on ways to improve the biological realism of the model, and (2) to obtain from the researchers estimates of the input parameters required by the TBEM. The workshop was very successful in achieving both objectives. The model will be modified to incorporate several improvements suggested by the researchers, and estimates of equilibrium biomasses for all the components of the ecosystem will be obtained based on the estimation of input parameters. Once this work is completed a second workshop will be held to discuss the biomass estimates obtained from the model and examine the fishing simulation portion of the model.

Background Document on Guam/Northern Mariana Islands Prepared

This month fishery biologist Richard N. Uchida reviewed the oceanography section of the Guam/Northern Mariana Islands background document being prepared by Dr. L. Eldredge of the University of Guam Marine Laboratory, under a contract let by the Honolulu Laboratory. Dr. Eldredge has completed sections on the historical background, description of the islands, and climate of the Guam/Northern Mariana Islands, and is presently completing the final section of the document which deals with the marine topography in the Mariana Archipelago.

Documentary Film of Northwestern Hawaiian Islands Resource Study Planned

Fishery biologist Reginald M. Gooding reports that a duplicate copy has been made of 2,800 ft of 16 mm movie film taken during cruise 81-04 of the NOAA research vessel Townsend Cromwell. The film was viewed for the first time this month, and a sequence narrative compiled. Most of the footage was of good quality. This material, plus footage collected from previous cruises, will be used in the production of a film documenting the resource study of the NWHI.

Deepwater Crabs Identified

Fishery biologist Robert B. Moffitt continued to work this month on the identification of specimens collected during cruises in the Northwestern Hawaiian Islands and Mariana Islands. Several species of homolid crabs have been frequently taken in deepwater shrimp traps. Moffitt has identified three

species, Homola ikedai, Hypsophrys williamsi, and H. superciliosa, from collections taken on a charter cruise in the Saipan area. These species showed complete vertical separation at sampling depths of 200, 400, and 600 fathoms, respectively. The target shrimp species also showed nearly complete vertical separation over these same depths: Heterocarpus ensifer at 200 fathoms, H. laevigatus at 400 fathoms, and H. longirostris at 600 fathoms. Three species of homolid crabs have also been taken in the NWHI. The vertical distribution of these species, Homola ikedai, Hypsophrys williamsi, and Paromola japonica, has yet to be investigated.

Drafts of Reports on Spiny Lobsters Completed

Fishery biologist Reginald M. Gooding has completed drafts of two administrative reports, "Predation on surface and bottom released spiny lobster, Panulirus marginatus, in the Northwestern Hawaiian Islands," and "Experiments to determine the effect of lobster offal on the catchability of lobster traps in the Northwestern Hawaiian Islands spiny lobster, Panulirus marginatus, fishery," and a note, "Predation on spiny lobster by the white ulua, Caranx ignobilis."

* * * * * * * * * *

This month fishery biologists Richard N. Uchida and Walter M. Matsumoto reviewed a proposal submitted to the University of Hawaii Sea Grant Program by Dr. Richard Brock, entitled "Modeling and enhancement of fishery resources due to floating objects." In addition, Uchida and Laboratory Director Richard S. Shomura reviewed a manuscript, "The application of non-directed interviews as a methodology in the analysis of management options: A case study of Tern Island," by Rose Pfund, University of Hawaii Sea Grant.

* * * * * * * * * *

Research assistant Bert S. Kikkawa worked on the preparation of the final cruise instructions for the first Resource Assessment Investigation of the Mariana Archipelago (RAIOMA) cruise scheduled for March 1982 to collect bathymetric and oceanographic data. Dr. Jed Hirota, University of Hawaii, has worked closely with Kikkawa in developing the oceanographic sampling design for the cruise.

* * * * * * * * * *

Fishery biologists Dr. Jeffrey Polovina, Dr. Stephen Ralston, and Robert Moffitt prepared background documents this month on lobster stock assessment, bottomfish stock assessment, and Pacific shrimp resources, respectively, for the third season of the Standing Committee on Resource Research and Development (SCORRAD), FAO, scheduled to be held this spring in Sydney, Australia.

FISHERY MANAGEMENT RESEARCH PROGRAM

Work Continues on Vessel Inventory Project

Dr. Robert A. Skillman, Fishery Biologist, reports that members of the Fishery Management Research Program are working to complete a report on the first phase, and implementing the second phase, of the vessel inventory project. Simple cross tabulations of the vessel inventory for Hawaii have been completed and will be done for American Samoa, Commonwealth of the Northern Mariana Islands, and Guam next month. These summaries and the contractor's report will be issued as an administrative report. The second phase of the project involves verifying the assembled data and classifying the boats by fishery. Skillman, fishery biologist Thomas S. Hida, and research assistants Bernard M. Ito, Walter N. Ikehara, and James C. Cooper have been working on this phase of the project. The proposal prepared by program personnel for carrying out the second phase was presented to the Western Pacific Regional Fishery Management Council at its December meeting where it was approved in principle. Program personnel are now preparing the necessary documents to gain OMB approval for conducting public interviews.

Interim Report on Hawaii Wholesale Fish Dealers Received

Industry economist Samuel G. Pooley reports that an interim report has been received from the contractor who is conducting a survey of the wholesale fish dealers in Hawaii in order to obtain information necessary for evaluating the impact of proposed management measures on this segment of the fishing industry. The contractor is continuing to conduct monthly interviews of Hawaii fish dealers on the "Survey of monthly prices and quantities of wholesale fish products in Hawaii." The report includes results obtained from the preliminary enumeration study, describes how these results were used in designing the monthly surveys, and presents the final statistical design. The preliminary analysis of the enumeration data and the report submitted by the contractor will be included in an administrative report.

At the request of the Pacific Regional Fishery Management Council (PRFMC), program personnel have prepared a paper entitled "Discussion of socio-economic research priorities in the western Pacific." The paper is not a statement of the research priorities of the Honolulu Laboratory but rather is a discussion of socio-economic research needs relating directly to the preparation of fishery management plans by WPRFMC.

* * * * * * * * * *

Fishery biologist Thomas S. Hida reports that the first draft of a manuscript describing the seabird food study is almost complete. Co-author Craig S. Harrison of the U.S. Fish and Wildlife Service is finishing the draft and scientific illustrator Tamotsu Nakata is preparing the illustrations and photographs for the manuscript.

PELAGIC RESOURCES INVESTIGATION

Final Draft Being Prepared of Manuscript on Computer Simulation Model

Dr. Jerry A. Wetherall, Leader of the Stock Assessment Study, and Marian Y. Yong, Mathematician, are working on the final draft of their NMFS Technical Memorandum, "User's guide to SIMPOP, a computer simulation model for analysis of fish population dynamics and harvest policies," after reviewing comments on an earlier draft. The document describes a FORTRAN program which allows the user to study both transitional and equilibrium characterization of a self-generating population harvested by a single gear. Process models such as growth, natural mortality, catchability, effort, reproduction, and recruitment are all user-specified. Various tables and plot outputs display transitional and/or equilibrium results for selected model variables as well as summary statistics. The use of SIMPOP is illustrated with examples of applications to a tuna baitfish stock in Palau, a pink coral stock in Hawaii, and North Pacific albacore.

Statistical Procedure to Analyze Length-Frequency Distribution Being Developed

This month fishery biologist Dr. Jerry Wetherall and mathematician Marian Yong continued to work on developing statistical procedures for analyzing length-frequency distributions. Such procedures will permit the efficient estimation of growth, mortality, and recruitment parameters from length-frequency data. There are two parts to the work. First, a generalized stochastic growth model has been developed and integrated with recruitment and mortality process models to yield a theoretical length-frequency distribution for a multi-cohort population. Special cases of the stochastic growth model are equivalent, in expectation, to well-known deterministic models such as von Bertalanffy, Gompertz, and the linear-segmental. Next, a maximum likelihood procedure will be developed to estimate parameters of the component process models based on an observed length-frequency distribution. Particular attention will be paid to evaluating the robustness of the estimation techniques and to developing criteria for applying the model in a variety of practical sampling situations.

Researchers Travel to California and Washington D.C. to Conduct Research and Attend Meetings on Geomagnetic Sense in Animals

En route to attend the special session on "Biomineralization of magnetite by living organisms" of the American Geophysical Union (AGU) held on December 10, 1981 in San Francisco, Michael M. Walker and Anjanette S. Perry, University of Hawaii graduate students, spent a week working with Dr. Joseph L. Kirschvink at the California Institute of Technology (Caltech) to carry out additional work on magnetite. Caltech has a more sensitive magnetometer than is available in Hawaii, which enabled Dr. Kirschvink, Walker, and Perry to test for the presence of magnetite in the head of blue marlin, Makaira nigricans, and to do a follow-up on work done earlier at the Honolulu Laboratory's Kewalo Research Facility on the likely magnetic sense organ in yellowfin tuna, Thunnus albacares, and green turtle, Chelonia mydas.

Using the Caltech magnetometer, a considerable amount of data were obtained on five blue marlin heads that Walker and Perry took with them. They found magnetic material within the ethmoid bones in the skull of all the blue marlin tested. All other blue marlin tissues tested showed no magnetic remanence. The ethmoid bone is also the site of magnetite concentration in yellowfin tuna. Thus, magnetite has been found in the same site in representatives of two different families of pelagic fish.

The three researchers also found in dissecting the blue marlin that a large branch of the lateral line nerve, which is presumed to be homologous to the suspected "magnetic nerve" in yellowfin tuna, occurs in close proximity to the ethmoid bone in the blue marlin. Dr. Kirschvink, Walker, and Perry speculate that they may be close to discovering the site of the magnetic sense organs in these species.

Experiments on an alternating field demagnetization (= degaussing) of the blue marlin magnetic tissues showed that the magnetic material is very likely magnetite and that it is present as single-domain crystals. The crystals are inferred to be slightly smaller than those found in yellowfin tuna but are still quite adequate to be the basis for a sensitive magnetic sense organ.

Further experiments were carried out on some tissues which had been fixed earlier from freshly sacrificed yellowfin tuna. These tissues had been cut into very small pieces so that any crystals they contained could be localized and examined using an electron microscope. Two pieces of "hot" tissues 1 to 3 mm in size were found. These tissues are likely to contain thousands, if not hundreds of thousands, of crystals so that the odds of locating crystals in situ would be very good. The researchers hope to determine whether and how these crystals are linked to the nervous system.

Also tested were tissues from the head of a green turtle to see if the results obtained from the one other adult turtle previously tested could be duplicated. Data obtained on this specimen compared well with those obtained on the first specimen which was tested on the magnetometer available in Hawaii. The earlier specimen tested showed magnetic material in numerous regions of the head and the highest concentration in pieces of dura membrane. At Caltech the researchers were able to carefully dissect out intact the

anterior portion of the dura. The concentration of magnetic material found in this region is comparable to that measured previously from whole hatchling turtles, thus indicating that the amount of total magnetic material increases as the animal grows. The demagnetization studies confirm that the magnetic material in green turtle dura is single-domain magnetite, and that the crystal size is similar to that found in yellowfin tuna.

At the AGU meeting Walker and Perry presented papers on their work on tunas and turtles, respectively. Other papers presented included many aspects of biomagnetism in animals ranging from bats to butterflies. Walker and Perry's papers turned out to be the leading contributions during the meeting, which can be attributed to the opportunity available at the Honolulu Laboratory's Kewalo Research Facility to attack the problem from many angles, particularly the behavioral responses of the test animals.

Walker, with Dr. Kirschvink, also traveled to Washington, D.C. to attend the special session on "Biological generation and detection of magnetic fields" of the American Association for the Advancement of Science held on January 4, where Dr. Kirschvink presented a paper on their magnetite work. It was apparent from the papers presented at both meetings that the Honolulu Laboratory appears in the enviable position of having experimental animals that are very amenable to magnetic sensitivity studies, and may well be the leader in this area of research.

* * * * * * * * * * *

Fishery biologist Walter M. Matsumoto has completed the first draft of a report tentatively entitled "U.S. squid fisheries." The report is being prepared for the third session of the Standing Committee on Resource Research and Development (SCORRAD), FAO, to be held this spring in Sydney, Australia.

DATA MANAGEMENT AND TECHNICAL SERVICES

Progress Made in Developing Tuna and RAIOMA Data Management Systems

Fishery biologist Fletcher V. Riggs reports that major progress was made this month in the development of data management systems for data on both tuna and the Resource Assessment Investigation of the Mariana Archipelago (RAIOMA). Computer programmer Mark A. Scheele developed specifications for the expansion of enhancement of the tuna data mangement systems which provide a series of secondary catch/effort files with a common or standardized format. The files were discussed and agreed upon in a series of meetings held this month between the Data Management and Technical Services (DMTS) staff and tuna data users. The ultimate objective of this series of files is to allow general purpose summarization or analytical software to be written and/or used to process all available tuna catch/effort data without requiring prior modifications in software or data format. The use of the data will be further enhanced by a small library of subroutines and functions to simplify the decoding, unit

conversion, and labeling of the output. A prototype system based on commonly used catch/effort data from four sources will be implemented and ready for testing by early next month.

Computer technician Ronald C. Antinoja completed the initial design specifications of a software system for data entry, verification, and validation for RAIOMA survey data. In addition to general system design, a prototype system for the shrimp trap report data has been completed and is undergoing testing and evaluation by DMTS data entry personnel. This system, developed on the East-West Center's PDP-11/70, will be followed by the development of various SAS procedures and data management utilities on the University of Hawaii's IBM-370/158 to allow (1) the incorporation of carefully checked and edited survey data into the data base, and (2) the general summarization and analysis of the data within a short period upon completion of each survey cruise.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

Norwegian Scientist Completes Sabbatical at Southwest Fisheries Center

Dr. Erlend Moksness, a visitor from the Statens Biological Station, Arendal, Norway, has completed a 3-month sabbatical with the Coastal Fisheries Resources Division. Dr. Moksness' visit, from October 15, 1981 through January 15, 1982, was sponsored by the Norwegian Fishery Research Council. During his stay here, Dr. Moksness investigated the methods used by the Coastal Division staff to study the feeding and behavior of fish larvae, histological and staining processes, and age-determination of fish larvae and juvenile fish through otolith analysis. Dr. Moksness determined the age of 2-year-old Skagerrak herring, using otoliths which he processed and aged with the help of laboratory technician Susan Longinotti. The estimated age of these herring (707-717 days) corresponded well with their expected age (about 700 days).

During his stay, Dr. Moksness also participated in a 2-week cruise aboard the NOAA research vessel, David Starr Jordan, in late October 1981.

COASTAL EASTERN PACIFIC FISHERIES ENVIRONMENT INVESTIGATIONS

Feasibility of Establishing U.S. Winter Longline Fishery for Albacore Tuna to be Investigated

Dr. R. Michael Laurs, Leader of the Fisheries Environment Investigation, reports that six chartered commercial fishing vessels departed on January 13, five from San Diego and one from Honolulu, to conduct exploratory longline fishing operations for albacore tuna and to make scientific observations in the area between about 900 to 1200 miles west of San Diego. The vessels, which will be at sea for a 35-day period, are being supported by Saltonstall-Kennedy funds awarded to the American Fishermen's Research Foundation. The study is being conducted cooperatively with the Southwest Fisheries Center and is designed to evaluate the feasibility of establishing a U.S. longline fishery on albacore during winter months. Data gathered during the exploratory fishing will also provide information on the distribution and migration patterns of the proposed southern substock of North Pacific albacore.

Three scientists from the SWFC, fishery biologist Dave Holts and biological technicians Dimitry Abramenkoff and Ronald Dotson, are each aboard one of three of the vessels to make scientific observations. Detailed records on the longline fishing gear used and modifications that may be made to the

gear are being kept on a set-by-set basis. In addition, experiments will be performed to determine the fishing depth of hooks on longline sets. Detailed records will also be kept on a hook-by-hook basis of fish catch and size composition of fish caught. Expendable bathythermographic (XBT) observations and other oceanographic data will also be collected in conjunction with fishing operations. The depth distribution and ocean temperature/albacore swimming depth relationships will be investigated by acoustic tracking experiments that are scheduled to be conducted from one of the vessels.

A half-day training session was held at the SWFC for the captains of the vessels prior to departure on the cruise to provide briefing information on historical catches made by the Japanese longliners in the eastern North Pacific as well as climatological oceanographic and weather information. Instruction was also given on keeping fishery records, making XBT and other observations and conducting fish tagging operations. Laurs led the training session, assisted by Dotson, fishery biologist Bob Nishimoto, and oceanographer Ron Lynn.

COMMERCIAL AND RECREATIONAL FISHERIES RESEARCH FOR MANAGEMENT

Plans to Revise the Northern Anchovy Fishery Management Plan Analyzed

During the past 2 months, members of this investigation have developed four analyses necessary for the revision of the Northern Anchovy Fishery Management Plan which has been requested by the Pacific Fishery Management Council (PFMC):

(1) The 1981 egg production estimates of anchovy spawning biomass - by fishery biologist Dr. Gary Stauffer and statistican Susan Picquelle.

(2) Procedure for calibrating the larva census estimates to the egg production estimates for the northern anchovy spawning biomass - by Stauffer.

(3) Anchovy biomass from 1951 to 1981: A reinterpretation based on egg production - by Alec MacCall, California Department of Fish and Game marine biologist stationed at the SWFC; and

(4) Anchovy population models and parameter estimation - by MacCall.

Each of these four reports was reviewed by the PFMC Scientific and Statistical Committee (SSC) during two meetings held at the La Jolla Laboratory on December 18, 1981 and January 15, 1982. The Anchovy Fishery Management Team met with the Anchovy Advisory Sub-panel in Long Beach, California, on January 21, to present essentially the same set of analyses in

summary form. All three Council-related committees (SSC, FMP Team, and Advisory Sub-panel) reported their recommendations to the Pacific Fishery Management Council in Seattle, Washington, on January 26, 1981. The Council concurred with all three committees in recommending that the FMP will remain in effect through the 1982-83 fishing season and probably through the 1983-84 season as well. This means that the annual reduction fishery quotas, a key feature of the Plan, will continue to be based upon a larva census-equivalent biomass measurement.

Due to the current uncertainty regarding the accuracy of the larva census-based biomass measure, the Council has decided to implement an amendment to the existing FMP which would have the NMFS Regional Director reserve half of the reduction fishery quota in the United States' Fishery Conservation Zone. The reserve would be released only after an in-season re-assessment of the stock abundance using all information available, including acoustic surveys, aerial spotter logbooks, fishery activity data (catch and effort), year class strength, and recruitment estimates. The Anchovy Plan Team members at the La Jolla Laboratory are currently developing the details of this amendment.

During the coming year several analyses will be needed. Analysis of recent paired plankton tows using standard 0.333 mm and a finer 1.150 mm mesh showed that about 20% of the anchovy eggs are missing fom the standard net tow; extrusion is the most likely reason. A correction factor is being developed, and will result in proportionately increased anchovy biomass estimates. The anchovy model will have to be revised accordingly. Other analyses include development of alternative models and fitting procedures and alternative management schemes.

Analysis Complete for 1981 Egg Production Estimates of Anchovy Spawning Biomass

Fishery biologist Dr. Gary Stauffer and statistician Susan Picquelle have completed analysis of the 1981 egg producion survey data and have prepared a written report documenting the results. Two egg production surveys were conducted in February and April 1981, concurrent with the 1981 survey by the California Cooperative Oceanic Fisheries Investigations (CalCOFI). The egg survey was conducted by the NOAA research vessel, David Starr Jordan, and the trawl survey by the California Department of Fish and Game charter, Nelle Belle.

Stauffer and Picquelle have calculated the 1981 egg production estimates of anchovy spawning biomass to be 572,000 metric tons (MT) for the 8102 February survey and 343,000 MT for the 8104 April survey. These estimates are 33% and 60%, respectively, below the 1980 estimate of 859,000 MT. (The approximately 95% confidence intervals are $\pm$ 36.6% for 8102 and $\pm$ 29.4% for 8104.) These estimates contradict the increase in biomass suggested by the 1981 larva census estimate of 2,544,000 MT, which was itself an increase from the 1980 estimate of 1,611,000 MT.

The estimates of daily egg production (Po) for the 1981 surveys were 7.8 and 4.9 eggs per tow, respectively, for the two surveys. These are considerably less than 10.5 eggs per tow for 1980. The egg mortality also decreased considerably from 32% per day in 1980 to 12% per day for 8102 and zero mortality for 8104. The fraction of females spawning per day was estimated to be about 12.5% per day compared to 14.5% for 1980. Batch fecundity per female was greater in 1981 compared to 1980. Fecundity of a 15-gram female (ovary free weight) is estimated to be about 10,200 eggs for February, 67% greater than a comparable 1980 value, and 8,300 eggs for April, 35% greater than 1980.

The average female weight was also down in the 1981 trawl surveys, compared to 1980. Females averaged 13.4 grams and 16.2 grams, respectively, for the two surveys. The increase from February to April is attributed in part to growth. The occurrence of small fish in the catches of the second survey was low in April, partly due to the large number of unsuccessful trawl stations off Baja, Mexico, where anchovies are smaller. In addition, the sex ratio for the trawl collection showed a pattern of male-dominated catches during the peak spawning hours, suggesting a bias in the trawl sampling gear which is probably related to spawning behavior. Elimination of samples collected between 2000 and 2259 on the first survey gave a sex ratio of 0.5. This bias was not as strong for the 8104 survey, although the pattern was present in the first half of 8104 and absent in the second half.

Procedure Developed to Calculate Anchovy Larvae Census Estimate from Egg Production Estimate

Fishery biologist Dr. Gary Stauffer has developed a procedure for converting egg production estimates of anchovy spawning biomass to equivalent larva census estimates. This procedure will be used in 1981 to provide the Southwest Region and the Pacific Fishery Management Council with an equivalent larva census estimate for establishing the 1982-83 anchovy harvest quota. The fundamental common link between these two biomass estimators is the daily production of larvae at the time of hatching. The production of larvae estimated from the plankton data collected on the larva census survey should be proportional to the daily rate of hatching eggs estimated from the egg production survey data.

From this basis Stauffer developed the following calibration:

$$B_L = b(18.9 \times 19^{-8}) \frac{sp}{Z} B_E,$$

where

B_L is larva census estimate of spawning biomass

B_E is egg production estimate

b is a constant of proportionality

s is total egg survival over the incubation period

p is daily production of eggs per ton of adult fish

Z is exponential larva mortality rate

The analysis of the calibration based on this equation provides relatively consistent values of b for the test years 1980 and 1981. The values of b for the three comparisons are 0.1514 for 1980, 0.1678 for February 1981, and 0.1922 for April 1981, a maximum 27% increase relative to the 1980 value. To demonstrate the calibration equation, predicted larva census estimates of the 1981 biomass from the 8102 and 8104 egg production surveys are 2,295,000 and 2,004,000 metric tons, respectively, for b equal to 0.1514 from 1980 and z equal to 0.1639 from 1981. These predictions amount to a 24-42% increase over the 1980 larva census estimate, given a 33-60% decline in the 1981 egg production estimates from 859,000 metric tons for 1980. The differences between these predictions and the actual larva census of 2,544,000 metric tons are equivalent to the differences in b for the three surveys.

Population Models Fitted To Revised Anchovy Time Series

Statistician Susan Picquelle worked with California Fish and Game biologist Alec MacCall and Program Leader Dr. Daniel Huppert this month to fit three different non-linear population growth models to MacCall's egg production equivalent of the historical anchovy larva census biomass time series. Picquelle began the project with the existing FORTRAN program written by Huppert utilizing a Marquardt's algorithm to minimize a residual function. Huppert and MacCall devised a residual function that gives weight to errors about the fitted curve in both the horizontal and vertical directions. Picquelle modified the program to fit three different models under consideration and suggested a different residual function, thus producing six programs, each one fitting one of the three models and using one of the two residual functions. She also added routines to the program to calculate the variance-covariance matrix of the parameter estimates and to calculate a matrix of approximate F-statistics. A final modification by Picquelle was the computation of a range of values for both parameters of the estimated growth equation which enabled her and MacCall to map out probability contours in the 2-parameter space. Each of the growth models is based on a 1-year transition in estimated biomass.

Each of these models implies a sustained level of harvest that is substantially below that estimated earlier using the larva census estimate for the years 1951-1966. The previous model, used in the current Anchovy Fishery Management Plan, gave a maximum sustainable yield estimate of 484,000 short tons. This was an "optimistic" estimate, primarily because it was based upon a model estimated from the years of rapid population growth. When the subsequent years to 1981 are included, the estimated intrinsic rate of growth is much smaller than before.

One problem with the earlier anchovy model was its inability to explain the extremely low anchovy biomasses observed in the early 1950's. The new model is more consistent with these observations. Unfortunately, this means that the fishery cannot sustain a large harvest indefinitely, although runs of favorable years may make large annual catches sustainable for perhaps a decade. At other times, the stock will remain at low levels of abundance for prolonged periods during which the fishery will be unable to sustain substantial catches.

* * * * * * * * * *

Dr. Richard Methot, who recently joined the Investigation as a fishery biologist, has been working with the Anchovy Fishery Management Plan Team in evaluating the egg production method for measuring anchovy biomass and in updating the production model used to manage the fishery. Methot is also analyzing several trawl surveys to evaluate the Program's capability of measuring the abundance of a young anchovy year-class. One of these surveys was conducted with a 6-ft Isaacs-Kidd midwater trawl in June 1979. Comparison of the catch in this small trawl to the catch in the standard CalCOFI Bongo net may extend the ability to measure anchovy larval mortality rates to an age of about 60 days.

COASTAL EASTERN PACIFIC: POPULATION BIOLOGY OF FISHES

Anchovy Population Shows Striking Changes in Reproductive Characteristics

Dr. John R. Hunter, Program Leader, reports that striking changes have occurred in the reproductive characteristics of the central stock of the northern anchovy during the 1981 spawning season (Table 1). These changes, identified by analysis of the reproductive data taken for the 1981 biomass estimate, include a marked decline in the female size at first maturity and a striking increase in batch fecundity (number of eggs produced per spawning batch).

Of females less than 95 mm, approximately twice as many were mature in 1981 as in either 1979 or 1980. The relative fecundity has increased from 444 eggs per gram female weight in 1980 to nearly 600 eggs per gram in 1981, a 35% increase in fecundity. Fecundity has increased to about the same level as observed by SWFC fishery biologist John MacGregor in the early 1950's. These changes may be a response to a decline in population size as both fecundity and size-at-first-maturity may be regulated to some extent by density-

dependent factors. This evidence, plus the unusual size frequency distribution of the juveniles taken in the fall of 1981 (reported in the December 1981 issue of the Center Monthly Report), indicate that major changes have occurred in the population and that these could be associated with a decline in population size.

Table 1. Comparisons of Anchovy Reproductive Stock, 1979-1981

	% maturity within various classes of female length				Relative fecundity eggs per gram female weight $\pm 2 \times SE_{\bar{x}}$	Mean weight of mature female (g)
Year	86-90 mm	91-95 mm	92-100 mm	101-105 mm		
1979	29	48	56	76	441 ± 44	15.8
1980	--	20	47	68	444 ± 28	17.5
1981	83	88	92	97	597 ± 33	14.8

Plankton from CalVET Samples Analyzed

Fishery biologist Dr. Angeles Alvarino, working with oceanographer Dr. Robert Owen on a case study of plankton community evolution, has completed counts of plankton by species from 27 CalVET samples. These samples were obtained in and beyond places of upwelled water that extended several hundred km from the southern California coast last May. Results have been tabulated and will be used to determine changes in overall community composition, in reproductive capacity of producers of larval fish food, such as copepods, and in predation pressure on fish eggs and larvae. These counts will be combined with those underway on microzooplankton and phytoplankton collections at the same sites, which are being processed by Owen and fishery biologist Pete Paloma.

Growth of Pacific Saury Studied

Fishery biologist John Butler has been working on the age and growth of Pacific saury. Preliminary results indicate very fast growth in the first year. Fish collected in October 1981 were hatched in March of that year. These fish measured over 200 mm in knob length (to the fleshy end of the caudal fin) and exhibited a growth rate faster than previous estimates. Pacific saury reach first maturity at about 200 mm. Thus, fish spawned in the spring are capable of spawning for the first time during the following spring.

Oceanic Fisheries Resources Division

MARINE MAMMAL BIOLOGY PROGRAM

U.S. and Soviet Scientists Collaborate on Dolphin Research

Professor Alexey V. Yablokov and Dr. Galina A. Klevezal of the Institute of Developmental Biology, U.S.S.R. Academy of Sciences, Moscow, spent 4 weeks working with marine mammal scientists at the Southwest Fisheries Center under the aegis of the Marine Mammal Project of the U.S.-U.S.S.R. Environmental Agreement.

Professor Yablokov and Dr. William F. Perrin, Leader of the SWFC's Marine Mammal Biology Investigation, collaborated on a new line of investigation, the use of non-metrical skull variation to differentiate between populations of pelagic dolphins. (Non-metrical characters are those that are not measured, such as presence or absence of a foramen.) The work is based on a hypothesis developed by Professor Yablokov and others and takes advantage of the existing large, single-school samples of dolphins of two species, Stenella attenuata and S. longirostris, killed incidentally in the tuna purse-seine fishery of the eastern tropical Pacific (ETP) during 1968-1980.

In this preliminary study, 419 skulls comprising 11 single-school samples from widely separated areas of the ETP were scored for up to 53 non-metrical characters. The results indicate that the method promises to be valuable in identifying breeding populations and perhaps also for studying intra-populational structure. A preliminary report on the results and feasibility of the approach is being prepared and a technical paper will be authored by Professor Yablokov and Dr. Perrin after the incorporation of additional data and application of multivariate analytical techniques.

Dr. Klevezal worked with Dr. Albert C. Myrick, Jr., Wildlife Biologist, on an investigation to test the hypothesis that tooth dentine may contain information on the reproductive histories of individual dolphins. They carried out a detailed study of stained sections of teeth of spotted dolphins, Stenella attenuata, from the tuna fishery; the samples included adult males and a series of females aged 11-17 years, with reproductive data. They also had available teeth from a spinner dolphin, S. longirostris, that gave birth during captivity. Dentinal marks associated with parturition and onset of lactation were found in the teeth of females. This is a first step in developing a broader approach to the analysis of age-specific reproduction than has been previously possible. It may also make possible retrospective review of populational reproductive rates in particular years or stages of exploitation. A preliminary report on these results will be prepared by Drs. Klevezal and Myrick. The next step will be to expand the analyses to include wider age coverage and to apply the method to other populations and species.

Both lines of investigation are important to the rational management of marine mammals and to furthering basic knowledge of their biology. The

collaborative projects will probably continue with possible participation by additional experts at both the Institute of Developmental Biology and the SWFC in the areas of statistics and multivariate analyses.

Age Determination Work in Progress for Pacific White-sided Dolphin Study

Dr. Albert C. Myrick, Jr., Leader of the Marine Mammal Age Determination (MMAD) Project, reports that age estimates are being made from teeth of approximately 125 specimens representing the northeastern Pacific white-sided dolphin, Lagenorhynchus obliquidens. The teeth were prepared in decalcified and stained thin sections by Kimberly Goodrich of the Hubbs-Sea World Research Institute (HSWRI) under the supervision of biological technician Priscilla A. Sloan at the La Jolla Laboratory and are being read following a technique developed by Myrick. Age estimates are based on layer counts of tooth dentine and cementum by Myrick, Goodrich, and William Walker (HSWRI). The age determination work, in which each reader makes two independent age estimates of each specimen, is part of a study of the life history parameters of the northeastern stock conducted by HSWRI under contract to SWFC.

Report Published on Dolphin Tagging, Marking, and Tattooing Research

Jacqueline G. Jennings, Fishery Biologist, has co-authored a Technical Memorandum entitled "An evaluation of tagging, marking, and tattooing techniques for small delphinids" with Merrill "Rusty" White of the Hubbs-Sea World Research Institute (HSWRI). The extensive report reviews various techniques examined by the SWFC in collaboration with HSWRI, the Southeast Fisheries Center's National Fisheries Engineering Laboratory, Sea World, Inc., and several other contractors. The goal of the research was to determine the least injurious method of placing long-lasting marks on spotted dolphins, Stenella attenuata, for population and migration studies. The technique had to be suitable for rapid application to large numbers of dolphins.

Previous tagging methods, including spaghetti tags and roto tags, were evaluated and rejected because of high tag loss and low visibility. Jennings decided to focus on highly visible tags. New tag designs with various attachment mechanisms were tested and evaluated for durability, visibility, retention times, and tissue trauma. Several materials including polyurethanes, polyethylene, Delrin, and Teflon were tested. Captive dolphins at Sea Life Park in Hawaii and wild dolphins off the Hawaiian coast were used to test the tags.

Sea Life Park and Sea World, Inc. also cooperated by permitting freeze-branding techniques on their pelagic dolphins, Stenella longirostris and Delphinus delphis. Dr. Keith Farrell, a world-reknowned expert in cryobiology, collaborated on this study. Several tools and the coolants, liquid nitrogen and Freon 22, were evaluated. Marks were made at various application times and application pressures. The report also reviews efforts to develop tattooing techniques. Preliminary investigations were made using

polystyrene particles coated with fluorescent "day glow" pigments sprayed into a section of Delphinus epidermis. Injection techniques were also evaluated.

As a result of all of these efforts, a new design was developed for a dorsal fin disc tag of polyurethane. Tags using the new design were successfully applied during 1978 to dolphins involved in the eastern tropical Pacific yellowfin tuna purse seine fishery.

Photographs of Coastal Bottlenose Dolphins Studied

Photographs of dolphins swimming off the La Jolla Laboratory have been taken for several years. These photographs are now being examined by Larry Hansen, Biological Technician, to test the feasibility of using body features to identify individual bottlenose dolphins (Tursiops truncatus) in the wild. Hansen reports that the dorsal fins of many of the individuals photographed thus far bear distinct scars. He has cataloged about 40 individuals from scars on the dorsal fin; 10 of these were photographed on two occasions and 5 on three or more occasions.

Use of Aerial Photographs to Count Elephant Seals Studied

Dr. Douglas DeMaster, Leader of the Coastal Marine Mammal Project, and LCDR Wayne Perryman, NOAA Corps, traveled to Santa Barbara, California, to review the proposed research plan of the Pacific Western Aerial Survey, Inc. (PWAS), to study elephant seals in the California Channel Islands Marine Sanctuary and to tour the Remote Imagery Laboratory, University of California, Santa Barbara. The contract calls for elephant seal pups to be counted from color transparencies of aerial photographs. Ideally, the entire pup production of the Channel Islands could be estimated in this way. Initial studies were designed to test the best altitude and film type; preliminary results, according to Sue Benech, PWAS, indicate that 750 ft. is the most suitable altitude and positive transparencies are the most desirable film type. As far as photo interpretation, use of an overlay grid considerably increases the consistency of repetitive counts. Benech estimates 3 hours per frame will be needed to count pups, juveniles, adult females/subadult males, and adult males. She feels that plotting positions of adult bulls could be correlated with total population size. The next test of the technique will be to compare pup counts from ground observers with photogrammetric counts. This research is being directed by the staff of the Coastal Marine Mammal Project and planned in cooperation with the National Park Service and the Southwest Regional Office.

Elephant Seal and Sea Lion Studies Initiated at San Clemente Island

January-February is the major pupping season for northern elephant seals, Mirounga angustirostris, in the California Channel Islands. Charles Oliver, Fishery Biologist, traveled to San Clemente Island during January to count and tag seals. The area on the west coast of the island from Seal Point to Lost

Point was surveyed. To date, one dominant and one non-dominant male have been seen as well as three pups, five adult females, and three 1-2-year-old animals. Oliver will continue to travel to the island during March and attempt to tag all elephant seals at the site. In conjunction with these visits, he has also been collecting data on annual abundance, food habits, and mortality of the California sea lion, Zalophus californianus, which inhabits the island.

Mark Lowry, Biological Technician, is also participating in the pinniped research on San Clemente Island. He removed scats from an abandoned haulout site at Mail Point in preparation for a sampling schedule. The site will be periodically checked for evidence of recolonization, and scats collected and analyzed to determine the animals' feeding habits. In November 1981, Lowry prepared a site at Mail Point. On the most recent visit, the site had been colonized by over 400 sea lions and one elephant seal. Collection of scats from this site has started.

MARINE MAMMAL MONITORING AND ASSESSMENT PROGRAM

Porpoise Data Base Conversion Completed

Computer specialist Frank Ralston and computer programmer analyst Ken Wallace stated that the conversion of the extensive data bases for porpoise research was completed this month. The conversion was from Computer Sciences Corporation's time-sharing INFONET computer system to University of California, San Diego's VAX system. This project was started in March 1981, and involved transferring data files and subsequently loading these data files into new data bases.

Wallace and Susan Boyer, EDS contractor, developed special software which is tied closely to VAX's DATATRIEVE system, for the conversion and manipulation of the new data base. The software is designed to maintain the system's independence, including data base formatting routines which automatically determine the format of named variables from data base dictionaries, and has self-documenting data base updating routines for correcting errors in specific records.

Using this software, Ralston converted the INFONET data bases to the VAX system, creating Index Sequential Access Method (ISAM) files. The new system is very similar to that of the INFONET system, but with access in two ways. Users may utilize either VAX's DATATRIEVE, a high level, English-language-type query and report writing language, or software developed by Wallace and Boyer.

The types of data on the new system include the following:

Data Type	Number of data bases	Years
Aerial Effort	4	74, 77, 79, 81
Aerial Sightings	4	74, 77, 79, 81
Bridge Log	7	75 - 81
Cruise Specifications	16	66 - 81
Marine Mammal Effort	11	71 - 81
Marine Mammal Sightings	11	71 - 81
Set Log	11	71 - 81
Kill	8	74 - 81
Tally	11	71 - 81
Vessel Activity	7	75 - 81
Vessel Specifications	2	74 - 75
Life History	11	N/A
	103	

Set log, tally, sighting, and effort data from the years 1971-1973 are computer accessible for the first time.

TUNA/BILLFISH RESOURCES PROGRAM

Proceedings of 32nd Annual Tuna Conference Available

The Proceedings of the 32nd Annual Tuna Conference, held at Lake Arrowhead, California, May 17-80, 1981, are currently being distributed by the Conference Chairman, Doyle Hanan (California Department of Fish and Game biologist stationed at the SWFC). Copies of the proceedings are available as Southwest Fisheries Center Administrative Report LJ-81-29.

Status of Atlantic Tuna Fishery Sampling Programs

Al Coan, Mathematician, reports that during the period January 1 to February 1, 1981, six U.S. and three foreign tuna purse seiners fishing in the Atlantic Ocean unloaded in Puerto Rico. Sixty size composition samples were collected for the SWFC by Inter-American Tropical Tuna Commission personnel. The sampling distribution by species was as follows:

Species	# vessels sampled	# of samples	# of fish sampled
Yellowfin	9	23	1153
Skipjack	9	30	1502

Bigeye	4	7	211
Other	4	5	145

Foreign-caught Atlantic tunas, transshipped to Puerto Rico, are sampled routinely for biological information by biological technician Eugene Holzapfel, who is stationed in Mayaguez. Data on fork length, weight and species composition of catches are collected. Results of Holzapfel's sampling during the period January 1, 1981 to February 1, 1982 are as follows:

Species	Gear	# of samples	# of fish sampled	Tonnage sampled (MT)
Yellowfin	Baitboat	13	900	94.54
	Purse Seine	19	1362	3130.67
Skipjack	Baitboat	9	452	3430.55
	Purse Seine	10	496	3343.24
Bigeye	Baitboat	8	278	62.32
	Purse Seine	3	126	98.46
Other	Purse Seine	2	100	233.30

TIBURON LABORATORY

FISH COMMUNITIES INVESTIGATION

Shortbelly Rockfish Samples Help Define Diel Feeding Patterns

Collections of the shortbelly rockfish, Sebastes jordani, taken this month off central California by the NOAA vessel, David Starr Jordan, have provided Tiburon Laboratory scientists with the samples needed to define the diel feeding patterns of this species. Cruise leader Tony Chess and fishery biologist Susan Smith collected the samples from eight sets taken with a midwater trawl just before sunrise and just after sunset. Chess and Smith were assisted by fishery biologist Sennen Salapare and biological technicians Brian Jarvis and Mike Bowers of the Tiburon Laboratory, and Connie Ryan of San Francisco State University. In addition to the collections of shortbellies, 24 collections of plankton were made with a Tucker net. These collections will be analyzed in order to correlate known prey items in the shortbelly diet with prey potentially available in its environment.

Plans Made for Second Groundfish Conference

During a visit to the California Department of Fish and Game office at Menlo Park this month, Dr. William Lenarz, Leader of the Rockfish Analysis Task, joined in discussions which formulated plans for the next Groundfish Conference. (The first Western Groundfish Conference was held October 18-20, 1981, in Gleneden Beach, Oregon, as a forum through which academic and management researchers involved in the study of groundfish on the West Coast could communicate. Details of the Conference were given in the November 1981 issue of the SWFC Monthly Report.) A steering Committee consisting of Lenarz, Frank Henry (California Department of Fish and Game), and Dr. Milton Love (Occidental College) has been established to organize this Conference, tentatively set for January 11-14, 1983, at Asilomar, California. While at Menlo Park, Lenarz also discussed the ongoing cooperative rockfish catch sampling program with California Fish and Game biologists.

FISHERIES DEVELOPMENT INVESTIGATIONS

Exploratory Night Fishing for Euphausiids Unsuccessful

This month fishery biologists Bill Leet and Sennen Salapare conducted two nights of exploratory fishing for euphausiids aboard the NOAA research vessel, David Starr Jordan. Tows using a midwater trawl were made January 12-13 in the same location over Monterey Canyon which produced good catches of euphausiids (400 lb/hr) last October. This time, however, three tows each

lasting one-half hour produced no catch, and the net was damaged on the fourth tow, terminating fishing efforts. This is the third time that the 1/16-inch mesh liner has ripped during fishing, and changes in design are being considered.

Cruise leader Leet considers the absence of catch inconclusive because the small number of tows made did not provide a sufficient opportunity to fish at different speeds and depths. The inability to complete the experimental fishing was most disappointing because seasonal distribution is of major importance in establishing a fishery for euphausiids.

PHYSIOLOGICAL ECOLOGY INVESTIGATION

Effects of Pollutants on Parasitized Striped Bass Analyzed

Dr. Jeannette Whipple, Investigation Leader, reports that tissue and blood samples from juvenile striped bass used in the parasite/pollutant study are being processed and analyzed. The fish were exposed to low sublethal levels of zinc, benzene, and zinc-bearing benzene after being infected with anisakid nematodes. All of the data have not been processed into the final statistical-significance form that will provide a concise assessment of the effects of these parasite/pollutant treatments. However, some observations can be noted.

When juvenile striped bass were exposed to approximately 40 ppb zinc and 100 ppb benzene together, analyses of liver samples revealed little or no zinc accumulation when compared to controls. Similar results have been reported in the literature in other fish species exposed to unrealistically high zinc levels in the low part-per-million range for time spans ranging from 4 days to 2 weeks. Zinc concentration in striped bass livers was approximately 150 g/g dry weight.

By comparison, there was an accumulation of benzene in tissues of fish exposed to benzene alone and to the zinc-benzene mixture; visual inspection of the data does not permit an evaluation of the differences in benzene accumulation between the two treatments. Exposure to 100 ppb benzene for 2 weeks produced mean tissue burdens of 8-10 ppm in fat deposits, approximately 2 ppm in liver and blood, and 0.5 ppm in muscle, with the greatest rate of accumulation occurring within the initial 2 days of exposure.

Plasma samples were also assayed for a cortisol response to the various treatments. An HPLC analysis did not indicate elevated plasma cortisol concentrations. This may be ascribed to any of several reasons. First, the possibility exists that these pollutants, at these levels, do not activate the hypothalamo-pituitary-interrenal axis in this series. Other reports indicate that not all pollutants produce a cortisol response in all species tested. Another possibility is that cortisol was degraded in storage when the ultra-cold freezer at the Laboratory malfunctioned on several occasions and caused the plasma samples to thaw. The chemical literature is unclear as to the

effect of these temperature changes on plasma corticosteroid integrity. Last, the sample sizes may have been too small (0.2-0.3 ml) for effective extraction.

The blood parameters used, however, were clearly affected by the parasite/pollutant exposures. Erythrocytes were destroyed during the early phase of exposure, followed by recruitment of reticulocytes into the circulatory system. Changes in hematocrit as exposure duration increased also reflected changes in red blood cell dynamics. Differential leukocyte distributions were altered, along with the general trend toward leukopenia, particularly in the benzene exposures. Differences in the serum protein profiles were also noted. There was an initial increase in Band 5, and perhaps Bands 2 and 3 in parasitized fish. There was also an apparent effect on the serum proteins due to the parasite and benzene combination. Perhaps the most dramatic effect was the supression of all serum protein bands in fish exposed to both benzene and zinc, especially during the late stages of exposure.

Effects of Environmental Pollutants on Adult Striped Bass Studied

This month members of the Physiological Ecology Investigation continued to analyze data from adult striped bass collected from several areas in the San Francisco Bay-Delta in an attempt to assess the health of these fish in relation to pollutant burdens. Factor analyses were run, with metals added to the data bases for 1978 and 1980. Analysis of preliminary results indicates that there are several important relationships among the factors which implicate metals in the condition of the fish. It was found that:

1) There are positive correlations between concentrations of zinc, copper and iron in liver tissue, but not always in gonads. Copper and iron are positively correlated in the gonads; zinc has a weaker correlation and appears to relate to other parameters measuring gonad condition separately from the other two metals.

2) When there are high metal levels in the liver, the liver somatic index (LSI) and the percentage fat in the liver (microscopic examination) are reduced, indicating poorer liver condition.

3) High concentrations of zinc in the gonads correlated with higher concentrations of PCBs and MAH (monocyclic aromatic hydrocarbons) in the gonads.

4) Ovaries in females contained more metals than testes in males.

5) Higher levels of zinc and a higher zinc/copper ratio in ovaries correlated with eggs being paler yellow (less green) in color and containing fewer calories/gram, indicating poorer condition of both eggs and ovaries. Females with a high level of zinc in their ovaries also had a poor body condition.

6) Higher levels of zinc in ovaries correlated with high levels of parasitic roundworm infections as well as with the number and severity of skeletal abnormalities.

Analyses are now being performed of the covariance of variables within factors.

PACIFIC ENVIRONMENTAL GROUP

FISHERY/ENVIRONMENTAL FORECASTING AND MODELING TASK

Multivariate Models Developed for Skipjack Tuna and Dungeness Crab

Dr. Roy Mendelssohn, Operations Research Analyst, transferred from the SWFC's Honolulu Laboratory to the Pacific Environmental Group one year ago and has continued to develop fishery forecasting models. Ready access to environmental data permits expansions of his models to include environmental variables. Availability of both fishery and environmental data have permitted Mendelssohn to complete two multivariate models, one on skipjack tuna caught in Hawaii and the other on dungeness crab occurring off central and northern California. The first model examines yearly size specific catches of and effort for skipjack tuna in Hawaii. The model suggests that catch of the four size classes and effort are driven by only one independent signal, which is almost identical to the catch of large tuna. The catch of large tuna, in turn, is well predicted (91.5% of the variance) by the relative position of the 20° C isotherm during the winter. These results lend support to early hypotheses which posit that most of the variation in the skipjack catch is due to the number of large tuna that return, following the currents, rather than to year class variation.

The second model is a forecasting model for dungeness crab. The model treats the monthly upwelling index as 12 different yearly series. Analysis reveals that these can be broken down into four underlying series. These four underlying series explain 86% of the variance of both the northern California and San Francisco catches. The model also offers a reasonable explanation as to why only the San Francisco catch crashed around 1960. The northern California one-step-ahead forecast residuals are stable over time. For the San Francisco catch, the parameters that forecast well pre-1957, also do so post-1957, given the events of 1957. However, the 1957 residual is an extreme outlier (normalized value of 3.4). This year was also an unusual year of warm water intrusion along the California coast. The differences in the two models in accounting for the unusual 1957 conditions suggest that it was this, and not events in 1960-1962, that caused the crash in the San Francisco catch. The model has been shown to provide a basis for operational forecasts, as it has successfully forecast years not included in the model construction.

FISHERIES INFORMATION SYSTEMS AND AUTOMATIC DATA PROCESSING

A Description of the WPACFIN--The Western Pacific Fishery Information Network

The Western Pacific Fishery Information Network (WPACFIN) refers to the integration of computer hardware, software, and data bases, and the persons and agencies associated with all aspects of implementation and operation of the fishery information network in the central and western Pacific regions. The principal agencies involved in the initial design and implementation of WPACFIN include the NMFS Southwest Fisheries Center's Honolulu Laboratory (HL) and Western Pacific Program Office (WPPO), the Hawaii Division of Aquatic Resources (HDAR), the Government of American Samoa Office of Marine Resources (ASOMR), Government of Guam Aquatic and Wildlife Resources Division (GAWRD), and the Commonwealth of the Northern Mariana Islands Department of Natural Resources (CNMI/DNR). Initially, the principal users of the system will include all of these agencies just mentioned, and the Western Pacific Regional Fishery Management Council (WPRFMC). All components are participating in the design and implementation of WPACFIN to insure that user needs are met. As the system develops and user requirements change, other agencies and users may easily become part of the WPACFIN because the system is modular in design to facilitate growth and change.

Initial hardware configuration for the WPACFIN (Figure 1) consists of (1) a central main frame computer accessed by four terminals and one dedicated printer, and (2) five minicomputer systems. The main frame computer is a PDP 11/70 with twin processors located at the East West Center in Honolulu, and will be utilized on a time-share basis via hard-wired communications lines between the HL and East West Center. The microcomputer systems are Apple II Plus microcomputers, and will be located in each of the WPACFIN major component government offices (NMFS/HL/FIN, HDAR, ASOMR, GDAWR, and CNMI/DNR) to facilitate local data collection and processing, and data transmission to the main frame computer. The microcomputers were installed at the various locations by David Hamm, HL Computer Systems Analyst, in December 1981 and January 1982.

More specifically, the HL/FIN main frame system configuration initially includes four terminals, each of which will have full access to all of the PDP 11/70 computing power, and will be able to perform the full range of processing activities. However, for design and implementation purposes, the initial configuration identifies one terminal for FIN data base management and program development functions, and two terminals for key-to-disk data entry and edit functions. The system's dedicated printer will have a keyboard and will also be usable as a terminal. In addition, the HL is utilizing two other terminals and one other printer for word processing activities. These could be used for FIN processing functions should the need arise. Finally, there are four other communication lines already in place between the HL building and the East West Center computer that can be easily hooked up to additional hardware to facilitate future growth.

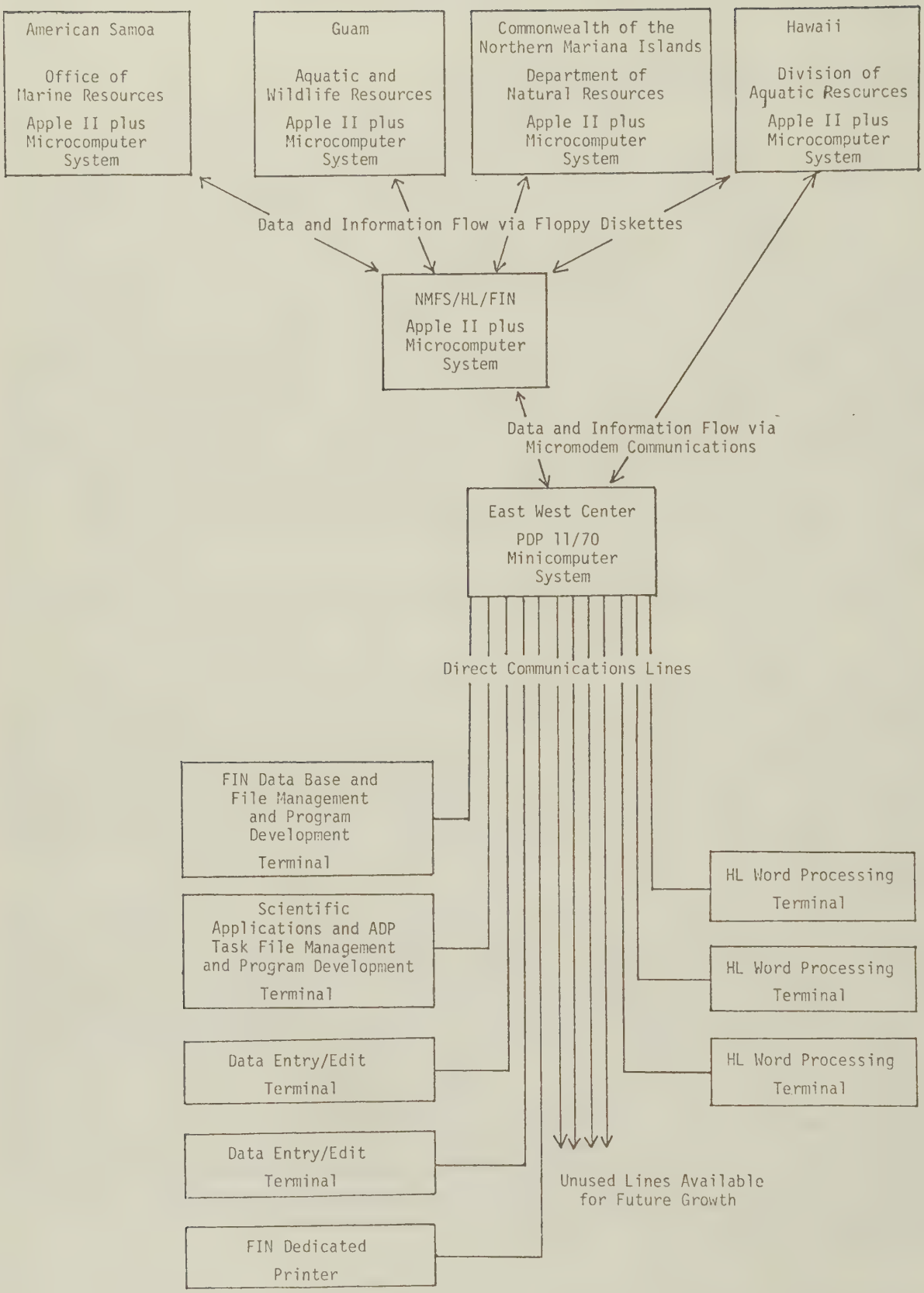
American Samoa
Office of Marine Resources
Apple II plus Microcomputer System
Guam
Aquatic and Wildlife Resources
Apple II plus Microcomputer System
Commonwealth of the Northern Mariana Islands
Department of Natural Resources
Apple II plus Microcomputer System
Hawaii
Division of Aquatic Resources
Apple II plus Microcomputer System
Data and Information Flow via Floppy Diskettes
NMFS/HL/FIN
Apple II plus Microcomputer System
Data and Information Flow via Micromodem Communications
East West Center
PDP 11/70 Minicomputer System
Direct Communications Lines
FIN Data Base and File Management and Program Development Terminal
Scientific Applications and ADP Task File Management and Program Development Terminal
Data Entry/Edit Terminal
Data Entry/Edit Terminal
FIN Dedicated Printer
HL Word Processing Terminal
HL Word Processing Terminal
HL Word Processing Terminal
Unused Lines Available for Future Growth

Figure 1. WPACFIN Hardware Configuration

The microcomputer systems are comprised of 48K Apple II Plus microprocessors with an additional 16K RAM language card, twin 5-1/4 inch floppy disk drives, a numeric key pad, and a clock/calendar card. Other peripherals include Epson MX-100 printers capable of printing 132 characters wide and having built-in dot matrix graphics capabilities, and 12-inch green screen monitors for visual display. In addition, 4-amp voltage regulators are included with each system to minimize the problems associated with power surges and voltage fluctuations. Finally, the HL/FIN and the HDAR microcomputer systems have DC Hayes micromodems to effect communication between the microcomputers and the PDP 11/70.

This hardware configuration is subject to modifications as the system grows and user needs evolve and become better defined. Future enhancements may include the possible conversion from a time-shared main frame to use of an in-house NMFS minicomputer, additional microcomputers or terminals in WPRFMC and WPPO staff offices, and possible additional computing capabilities for the HDAR and the island territories.

The current status of the HDAR FIN System Study was reviewed at a meeting this month attended by Hamm, SWFC data systems manager Fred Kellenberger, and HDAR personnel. Meeting participants agreed that good progress is being made. The NMFS data requirements will be submitted in draft form by Dr. Robert Skillman, HL Fishery Biologist, before February 15. The following aspects of the HDAR system were discussed at the meeting: 1) data collection and data entry improvements, and 2) extended computerization of the HDAR Catch Report system. The target date of the draft of the system study report is early April. Potential use of the PDP 11/70 System of the East West Center was also discussed. It was agreed that it is too early to firm up any usage of the system for HDAR data reduction. Hamm and Andy Sweetland, Hawaii Division of Aquatic Resources, reviewed HDAR Apple II application. The HDAR Autodat program running under CP/M with the Sortcard was demonstrated. The CP/M extended BASIC proved to be a significantly more effective programming language than Apple FP BASIC.

WPACFIN Update

David C. Hamm, Computer Systems Analyst at the SWFC's Honolulu Laboratory, reports that significant advances have been made toward improving the ability of fisheries agencies in the island governments participating in the Western Pacific Fishery Information Network (WPACFIN) to capture fisheries data and make them available for analysis. Hamm installed microcomputers in American Samoa in December and in the Commonwealth of the Northern Mariana Islands and in Guam in late January. The local staffs have also been trained in the use of these microcomputers. Communication links between the Honolulu Laboratory and the East-West Center's microcomputer, which is to be the central mainframe computer for use by WPACFIN, have been established. These communication links will be used for entering data, data base management, and computer program development.

Financial Report System Program Debugged

Systems analyst Dorothy Roll reports that a major effort was made this month to test a debugging of the converted Financial Report System (FRS). John Davies, Computer Specialist stationed with the Southwest Region, Terminal Island, California, has made changes to the data base structures and data entry programs to resolve problems. All initial data, including changes and deletes to the data, have been entered by Ruth Toles, contract Key Operator. The audit reports from the commitment and labor files are under review by Ben Remington, Executive Officer, and Daisy Gaston-Akinwanile, Accounting Technician. A test run of the six summary reports on the current year data has also been made. The output has been critiqued by Remington and returned to ADP Operations for report program debugging.

Final Meeting on NOAA Functional Filing System Held

On January 12 the Technical Study Group held the final review meeting on the NOAA functional filing system. Attending the meeting were Dorothy Roll, Systems Analyst; Frances Tonsich, Secretary-Stenographer; Virginia Hostler, Secretary; Julie Shoemaker, Clerk Stenographer; Emille Cole, Clerk Typist; and Lorraine Prescott, Editorial Assistant. All the Center's operating groups in La Jolla are now filing under the new system. Index lists for the filing system have been or are being developed by each group. Copies of index lists will be forwarded to Mary Lynn Godfrey, Administrative Officer for the Honolulu Laboratory, as guidance for their conversion to the NOAA functional filing system for the Honolulu Laboratory.

Three Technical Users Meetings Held in January

ADP Operations hosted three computer technical users meetings this month. An announcement was made during the first meeting concerning the University of California at San Diego's plan to discontinue the B7800 service for research projects by July 1982. Included would be the removal of the card punch machines and the remote job entry station (card reader/printer). Users were requested to document the hardships this would impose, to estimate the time necessary for conversion of ALGOL programs, and to draft a work schedule for the copying of system dependent tapes to foreign tapes. During the other two sessions, topics of special interest were discussed: Ken Wallace, Computer Program Analyst, spoke on "The porpoise data base management system," and Susan Boyer, EDS contractor, talked about "A FORTRAN data base formatting package."

* * * * * * * * * *

This month, Robert Nydam rejoined the Center staff as a computer programmer analyst with ADP Operations. Nydam is replacing computer programmer Butch Burris who transferred to a position with the Navy in October 1981.

* * * * * * * * * *

The last two of the eight lines from the multiplexer have been installed to service two offices in Wing D of the Center's La Jolla Laboratory. The multiplexer, located in Wing B, is the hardware device which bypasses the telephone switch board and links the 8 lines to the data switch at the Computer Center at the University of California, San Diego.

MISCELLANEOUS

HONORS AND AWARDS

At a general staff meeting at the Southwest Fisheries Center in La Jolla, Director Izadore Barrett was pleased to present a variety of awards, as follows:

A. Gail Theilacker, Fishery Biologist, received Honorable Mention Recognition from the NMFS Publications Advisory Committee for her paper, "Effect of starvation on the histological and morphological characteristics of jack mackerel, Trachurus symmetricus, larvae" which appeared in a 1978 issue of the U.S. Fishery Bulletin.

Roderick J.H. Leong, although not present at the meeting, received the NMFS Publications Advisory Committee's Honorable Mention Recognition for his paper, "Maturation and induced spawning of captive Pacific mackerel, Scomber japonicus," which was published in a 1977 issue of the U.S. Fishery Bulletin.

As mentioned earlier in the November 1981 SWFC Monthly Report, Dr. W. Perrin, D.B. Holts and R.B. Miller received the Outstanding Publication Award of the NMFS Publications Advisory Committee, for their 1977 paper published in the U.S. Fishery Bulletin, "Growth and reproduction of the eastern spinner dolphin, a geographical form of Stenella longirostris in the eastern tropical Pacific. At this Staff Meeting, Ms. Miller represented all three authors when she picked up the actual citation.

Dr. R. Michael Laurs, together with co-authors James H. Johnson and Heeny S. Yuen, received Honorable Mention Recognition by the NMFS Publications Advisory Committee for their paper, "Small-scale movements of albacore, Thunnus alalunga, in relation to ocean features as indicated by ultrasonic tracking and oceanographic sampling," published in a 1977 issue of the Fishery Bulletin.

Dr. Laurs, with co-author Ron Lynn, also received recognition for their paper, "Seasonal migration of north Pacific albacore, Thunnus alalunga, into North American coastal waters: Distribution, relative abundance and association with transition zone water." Although not selected for the monetary award, the Committee awarded the paper Honorable Mention Recognition.

John Carr, Deputy Director, SWFC, received a 25-year federal length of service pin; Dr. Al Myrick received a 15-year length of service pin.

Ruth Miller also picked up a special award in recognition of her service as chairman of the 1981-1982 Combined Federal Campaign.

Pleased recipients of NMFS publications awards are left to right: Dr. Michael Laurs, Ms. Ruth Miller, Ms. Gail Theilacker, and Mr. Ron Lynn.

Recipients of length of service awards are left: Dr. Al Myrick and right, Mr. John Carr.

Ruth Miller, Biological Technician at the La Jolla Laboratory, shows off certificate presented to her in recognition of her efforts as director of the Combined Federal Campaign at the Southwest Fisheries Center in 1981-1982.

PUBLIC AFFAIRS

Thirty students from an oceanography class at Grand Canyon College, accompanied by their instructor, Juanita Weber, visited the Southwest Fisheries Center on January 13, where they were hosted by Shari Sitko, General Biologist. After a slide presentation on Center research activities, oceanographer Ron Lynn described albacore/satellite tracking studies and answered questions.

During a tour of the research facilities Betsy Stevens, Fishery Biologist, answered questions on fish identification, biological technician Eric Lynn conducted a tour of the Center's experimental aquarium and wildlife biologist Dr. Doug DeMaster discussed the Coastal Marine Mammal program.

SEMINARS

La Jolla Laboratory

January 19 - Dr. James J. Simpson, Scripps Institution of Oceanography, University of California, San Diego, presented a talk on "Exchange of gas between the ocean and atmosphere in the California Current."

26 - Dr. Marc Mangel, University of California, Davis, spoke on "Search effort and catch rates in fisheries."

Tiburon Laboratory

25 - Pete Beneville gave a talk entitled "Acute toxicity of seven alicyclic hexanes to striped bass (Morone saxatilis) and bay shrimp (Crangon franciscorum) in seawater" to the San Francisco Bay and Estuarine Association in Concord, California.

TRAINING

La Jolla Laboratory

January 28-29 - Helen Becker, Editorial Assistant, participated in an Office of Personnel Management training course on "Proofreading," in San Diego.

VISITORS

Honolulu Laboratory

January 13 - Ken Hirayama, Honolulu representative of the Japan Fisheries Association, visited Laboratory Director Richard Shomura, Tamio Otsu, Richard Uchida, and Ray Sumida.

18 - Kenneth J. Rosenberry, Economics and Institutional Marketing Consultant, Bellevue, Washington visited Tamio Otsu.

La Jolla Laboratory

January 5 - Mr. and Mrs. Donn Marrin, Pacific Environmental Research Company, Los Angeles, California.

- Mr. Masaaki Ishii, Manager, Agriculture and Fisheries, Japan Trade Center of Los Angeles, California.

5-6 - Gary Smith of the Southwest Region, Dick Roe and Dean Swanson, Office of Marine Mammals and Endangered Species, NMFS, came to the Center to meet with Dr. Izadore Barrett, and Dr. Gary Sakagawa to discuss FY 1982 tuna/porpoise issues.

6 - Norma Jean Sunds, Marunbiologisk Station, University of Tromsø, Tromsø, Norway.

8 - Carol A. Reilly, University of California, Santa Cruz.

12 - A group of students from Palomar College toured the Center and visited the larval lab.

15 - Richard C. Goldweber, Palmdale School District, Reseda, California.

19-20 - Norm Abramson, Director of the Tiburon Laboratory, Gunter Seckel, Chief of the Pacific Environmental Group, and Richard Shomura, Director of the Honolulu Laboratory, came to La Jolla to attend the Center Management meeting.

22 - E. Charles Miller, Director of the California Department of Fish and Game, Mel Odemar, CDF&G, and Alan Ford and Gary Smith of the Southwest Region came to the Center to attend the State/Federal meeting.

26 - Colin Clark, University of British Columbia, and Mark Mangel, University of California, Davis, visited the Center.

Pacific Environmental Group

January 26 - Dr. Robert T. Mahler, Director, Office of Programs, ERL, visited Gunter Seckel, Chief of PEG, to acquaint himself with PEG's work.

Tiburon Laboratory

January 11 - Bruce Wyatt, University of California Sea Grant, Santa Rosa, California.

20 - Bruce B. Levy, Bruce L. Levy Co., Seattle, Washington.

21 - Paul Engler, Tyee Club, San Francisco, California.

22 - William Jaeckle, Humboldt State University, Mill Valley, California.

MEETINGS AND TRAVEL

Honolulu Laboratory

January 5-6 - Laboratory Director Richard Shomura attended the Pacific Tuna Development Foundation meeting at the Hawaiian Regent Hotel.

11 - Richard Shomura, Dr. Robert Skillman, David Hamm, and Sam Pooley met with Svein Fougner of WPRFMC.

14-15 - Sam Pooley attended the SWFC/SWR socio-economic research meeting in La Jolla, California.

17-21 - Richard Shomura traveled to Seattle, Washington, to meet with R. Adm. Charles K. Townsend, Director, Pacific Marine Center, and to La Jolla, California, to participate in the Center Management meeting.

23-29 - Sam Pooley traveled to Guam and Saipan to attend the WPRFMC meeting.

25 - Walter Matsumoto and Michael Seki departed for Kauai where they boarded the Hokkaido University's vessel Hokusei Maru on January 26 for the first leg of the cooperative squid research cruise.

La Jolla Laboratory

January 5-6 - Director Barrett met with Messrs. Gary Smith of the Southwest Region, Richard Roe and Dean Swanson of the Marine Mammal Group (FMM) in Washington, D.C. and Dr. Gary Sakagawa on the FY1982 tuna/porpoise issue.

10-11 - Dr. Izadore Barrett, Center Director, traveled to Washington, D.C. to brief Tony Calio, NOAA Deputy Administrator, on NMFS science programs.

11 - A meeting regarding albacore charter boats was held at the Center.

11-12 - Dr. Dan Huppert traveled to Davis, California, to attend a meeting on the West Coast Limited Access Contract.

11-16 - Fred Kellenberger traveled to Honolulu, Hawaii, to attend FIN and ADP meetings with the State, Honolulu Laboratory, and Southwest Region Personnel.

11-17 - Dr. William Perrin traveled to Washington, D.C. to work at the Smithsonian Institution.

12 - A CalCOFI meeting was held at the Center.

- A Technical Study Group meeting was held at the Center.

12-14 - Dr. Izadore Barrett traveled to Miami, Florida, to attend a NMFS Research Council meeting.

14-15 - A FY1982 Socio-economic Statistics Project meeting was held at the Center.

15 - An Anchovy Sub-Committee meeting was held at the Center.

- Dr. Reuben Lasker traveled to Los Angeles, California, to attend a Sea Grant review at the University of Southern California.

18 - An awards ceremony was held at the Center.

19-20 - A Center Management meeting was held at the Center's La Jolla Laboratory.

19-24 - Dr. Rick Methot traveled to Davis, California and Bodega Bay, California to continue analysis of Dungeness crab population dynamics with Dr. Louis Botsford, University of California, Davis.

20-22 - Chuck Oliver traveled to San Clemente Island, California, to conduct studies on elephant seals.

21 - Center Director Dr. Izadore Barrett traveled to Long Beach, California, to attend an anchovy sub-committee meeting of the Pacific Fishery Management Council's SSC.

22 - Dr. Izadore Barrett, Center Director, and David Mackett, Planning Officer, attended the State/Federal meeting at the Center.

25-27 - Dr. Izadore Barrett, Center Director, traveled to Seattle, Washington, to attend the Pacific Council's SSC meeting.

25-28 - Dr. Daniel Huppert traveled to Seattle, Washington, to attend Pacific Fishery Management Council and SSC meetings on anchovy/salmon plans.

27-29 - Chuck Oliver traveled to San Clemente Island, California, to conduct studies on elephant seals.

Pacific Environmental Group

January 18-21 - Gunter Seckel, Chief of PEG, traveled to La Jolla, California, to attend the Center Management Meeting and to confer with associates at the Scripps Institution of Oceanography.

Tiburon Laboratory

January 13-16 - Ed Ueber attended the Economist Meeting in La Jolla, California.

14 - Laboratory Director Norm Abramson met with Mel Odemar, Tom Jow and Herb Frey of CDF&G at the State's Menlo Park Laboratory to discuss an inventory of catch sampling procedures. This meeting was preparatory to trips by Odemar and Abramson to each of the California ports in which samplers are based.

18-20 - Norm Abramson traveled to La Jolla, California, to attend the Center Management Meeting.

21-22 - Tina Echeverria traveled to Eureka and Ft. Bragg, California, to collect specimens, collect sampling gear and terminate employees.

27 - Norm Abramson attended a meeting in San Francisco called by the Department of Commerce's Inspector General. Mr. Sherman Funk, IG, explained his unit's goals and methods to the heads of DOC offices in the San Francisco area.

30 - Norm Abramson attended the San Francisco Tyee Club's Installation of Officers Banquet and addressed the group on the Laboratory's cooperative programs with the Club.

PERSONNEL ACTIONS

Honolulu Laboratory

January 4 - Marlene W. Dung, Data Processor - Temporary, 1040-hour Student Appointment.

16 - Henry M. Kishinami, Biological Aid - Termination. Expiration of Appointment.

17 - Brent M. Miyamoto, Computer Assistant - Extension of Part-time, Temporary Appointment.

24 - Thomas K. Kazama, Fishery Biologist - Promotion.

- James H. Prescott, Biological Technician (Fisheries) - Full-time, Temporary Appointment.

La Jolla Laboratory

January 10 - E. Scott Miller, Biological Technician - Promotion.

- Colleen Coultas, Clerk Typist - Promotion.

11 - Sandra Paez, NOAA Junior Fellow - Leave Without Pay.

- Lisa Akenbrandt, Biological Aid - Temporary Appointment

- Robert Nydam, Computer Program Analyst - Return to Duty.

22 - Cynthia Meyer, Biological Technician - Pay Adjustment to Part-time.

24 - Pedro Paloma, Fishery Biologist - Redescription.

- John Butler, Fishery Biologist - Redescription.

Tiburon Laboratory

January 10 - Michael Bowers, Biological Technician - Promotion.

22 - Michael King, Biological Aid - Expiration of Appointment.

26 - Lisa Andrade, Biological Aid - Expiration of Appointment.

UNITED STATES
DEPARTMENT OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
SOUTHWEST FISHERIES CENTER
8604 LA JOLLA SHORES DRIVE
P.O. BOX 271
LA JOLLA, CALIFORNIA 92038

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, $300

AN EQUAL OPPORTUNITY EMPLOYER

POSTAGE AND FEES PAID
DEPARTMENT OF COMMERCE
210

THIRD CLASS